

CLAIMS:

1. A tuned OLED device, comprising:
 - a) a microcavity structure including a light-emitting layer for producing light, a semitransparent reflector, and a reflector layer disposed on opposite sides of the light-emitting layer, the microcavity structure enhancing on-axis light produced from the light-emitting layer in at least one particular wavelength to produce a desired on-axis viewed color while not substantially enhancing on-axis other wavelengths of such light; and
 - b) a layer including a color change medium which is responsive to wavelengths of light shorter than the particular wavelength by absorbing such shorter wavelengths of light and emitting light corresponding in color to the particular wavelength, thereby improving the color of the light produced by the OLED device when viewed in an off-axis direction.
2. The tuned OLED device of claim 1 wherein the light-emitting layer produces broadband wavelength light.
3. The tuned OLED device of claim 1 wherein the particular wavelength of on-axis light is in the red, green, or blue portions of the spectrum.
4. The tuned OLED device of claim 1 wherein the color change medium layer is disposed over the semitransparent reflector.
5. The tuned OLED device of claim 4 further including a dielectric stack disposed between the color change medium layer and the semitransparent reflector.
6. The tuned OLED device of claim 1 wherein the reflector also functions as an electrode.

7. The device of claim 1 wherein the semitransparent reflector also functions as an electrode.
8. The tuned OLED device of claim 1 wherein the device is a passive matrix device.
- 5 9. The tuned OLED device of claim 1 wherein the device is an active matrix device.
- 10 10. The tuned OLED device of claim 1 wherein the microcavity structure further includes a transparent cavity-spacer layer.
11. The tuned OLED device of claim 10 wherein the thickness of the transparent cavity-spacer layer, refractive index of the transparent cavity-spacer layer, or both, are adjusted in conjunction with the thickness and refractive index of the layers of the tuned OLED device to tune the microcavity structure to the desired color.
- 15 12. The tuned OLED device of claim 1 wherein the device is bottom-emitting.
13. The tuned OLED device of claim 1 wherein the device is top-emitting.
14. The tuned OLED device of claim 1 further including a color filter.
- 20 15. A tuned multicolor OLED device having an array of different color pixels wherein at least two of such different color pixels comprise:

a) a microcavity structure including a light-emitting layer for producing light, a semitransparent reflector, and a reflector layer disposed on opposite sides of the light-emitting layer, the microcavity structure enhancing on-axis light produced from the light-emitting layer in at least one particular wavelength to produce a desired on-axis viewed color while not substantially enhancing on-axis other wavelengths of such light; and

b) a layer including a color change medium which is responsive to wavelengths of light shorter than the particular wavelength by absorbing such shorter wavelengths of light and emitting light corresponding in color to the particular wavelength, thereby improving the color of the light produced by the OLED device when viewed in an off-axis direction.

16. The tuned OLED device of claim 15 wherein there is a common light-emitting layer for the microcavity structure for each of the at least two such different color pixels.

15 17. The tuned OLED device of claim 15 wherein the light-emitting layer produces broadband wavelength light.

18. The tuned OLED device of claim 15 wherein the particular wavelength of on-axis light is in the red, green, or blue portions of the spectrum.

19. The tuned OLED device of claim 15 wherein the color change medium layer is disposed over the semitransparent reflector.

20 20. The tuned OLED device of claim 19 further including a dielectric stack disposed between the color change medium layer and the semitransparent reflector.

21. The tuned OLED device of claim 15 wherein the reflector also functions as an electrode for at least one of the pixels.

22. The tuned OLED device of claim 15 wherein the semitransparent reflector also functions as an electrode for one or more of the
5 pixels.

23. The tuned OLED device of claim 15 wherein the device is a passive matrix device.

24. The OLED device of claim 15 wherein the device is an active matrix device.

10 25. The tuned OLED device of claim 15 wherein at least one pixel further includes a transparent cavity-spacer layer.

26. The tuned OLED device of claim 25 wherein the thickness of the transparent cavity-spacer layer, refractive index of the transparent cavity-spacer layer, or both, are separately adjusted for each different color pixel in
15 conjunction with the thickness and refractive index of the layers of the tuned OLED device to tune the microcavity structure to the desired colors.

27. The tuned OLED device of claim 15 wherein one or more of the OLED layers are separately patterned for one or more of the pixels.

28. The tuned OLED device of claim 15 wherein the device is
20 bottom-emitting.

29. The tuned OLED device of claim 15 wherein the device is top-emitting.

30. The tuned OLED device of claim 15 wherein one or more of the pixels further include different color filters.

31. The tuned OLED device of claim 15 wherein the device is a full color device.